

Summary

# Summary

---

## BACKGROUND

### Reclamation Water Contracting Program

The U. S. Bureau of Reclamation (Reclamation) is proposing to resume long-term contracting of approximately 1.5 million acre-feet per year (af/yr) of available and uncommitted water from the Central Valley Project (CVP) to meet agricultural, municipal and industrial (M&I), and refuge water needs. The water proposed for contracting, which originates from existing storage facilities in the northern CVP (Shasta, Trinity River, and American River Divisions), would be sufficient to meet only a portion of the current 3.4 million af/yr of need for CVP water.

Entering into new long-term CVP water contracts is a major federal action that may have significant consequences for the environment. The National Environmental Policy Act (NEPA) requires that an Environmental Impact Statement (EIS) be prepared for such actions. Reclamation has prepared comprehensive EIS's that assess proposed actions and alternatives for each of the three distinct geographical areas that would be served by the new water contracts. The three areas are the Sacramento River Service Area (SRSA), the American River Service Area (ARSA), and the Delta Export Service Area (DESA).

The purpose of the water contracting EIS's is to evaluate the regional and cumulative impacts of alternative allocations of available CVP yield. Subsequent site-specific NEPA environmental reviews, of much narrow scope, will be conducted prior to execution of contracts with individual agencies. General site-specific analyses are included in the water contracting EIS's to assist in program decision making.

In preparing these EIS's, Reclamation has held public meetings; solicited written input from public and private agencies, interest groups, and individuals; and distributed to the public information that responded to concerns of these agencies, interest groups, and individuals.

### Location of CVP Service Areas

The CVP service area extends for approximately 430 miles through much of California's Central Valley, from Clair Engle and Shasta Reservoirs in the north to Bakersfield in the south. The CVP service area also includes urban areas south and east of San Francisco Bay and the San Felipe Unit, which is located in the adjacent coastal valleys.

The CVP service area has been divided into three separate service areas for purposes of the water contracting programs. The SRSA encompasses the northern portion of the CVP service area and includes the Shasta and Clair Engle Reservoirs area and much of the Sacramento Valley. Water contracting within the SRSA would affect portions or all of the counties of Shasta, Tehama, Glenn, Colusa, Yolo, and Solano.

The ARSA includes Folsom Reservoir and all of Sacramento and San Joaquin Counties. Water contracting within the ARSA would affect Sacramento and San Joaquin Counties and a small portion of Placer County.

The DESA includes all of the CVP service area located south and west of the Delta. It begins just south of the Delta, extends through the San Joaquin Valley to near Bakersfield, and includes the San Felipe Unit. Water contracting within the DESA would affect the counties of Fresno, Kern, Kings, Madera, Merced, San Joaquin, Tulare, Monterey, San Benito, Santa Clara, and Santa Cruz.

## **PURPOSE OF AND NEED FOR WATER CONTRACTING**

### **Background**

Reclamation has contracted to provide water service to California's Central Valley for multiple use purposes since completion of the initial features of the CVP in the 1940s. Contracts have been executed for the sale of agricultural and M&I water throughout the CVP service area. In addition, the project controls flood flows, generate hydropower, and provides water for fisheries, wildlife, and recreation.

Reclamation's multipurpose water development projects have played an indispensable role in the state's development, making California the nation's premier agricultural region. The CVP alone provides water to over 2.8 million acres in the vast Central Valley Basin. Crops grown on California lands irrigated by the CVP had a gross value of approximately \$2.9 billion in 1986. In addition to irrigation water, the CVP provides large volumes of water to meet demands for municipal and industrial water. In 1986, nearly 536,000 acre-feet of water was delivered for domestic and industrial uses.

Historically, Reclamation constructed CVP facilities to meet water demands projected during the planning of these facilities. Today, however, the remaining available CVP yield of approximately 1.5 million af/yr is insufficient to meet the 3.4 million af/yr of estimated needs.

Concerns about water quality in the Delta add to the water supply problem and may affect the amount of water that can ultimately be delivered CVP-wide. In 1979, in response to environmental and water quality concerns in the Delta, the U. S. Department of the Interior (DOI) deferred contracting for additional long-term CVP water supplies until federal responsibility for water quality in the Delta could be determined. Studies by the California Department of Water Resources (DWR) and Reclamation to clarify joint responsibility of the CVP and DWR's State Water Project (SWP) in meeting water quality

standards in the Delta resulted in a proposed Coordinated Operation Agreement (COA). Public Law (PL) 99-546 authorized Reclamation to execute the proposed COA, and in 1986 the state and federal governments signed the agreement. Under the agreement, the operational efficiency of both projects can be improved by joint use of facilities. Both parties are to meet a specified set of water quality standards based on State Water Resources Control Board (SWRCB) Decision 1485. Provisions are made for the state to purchase interim CVP water, and for Reclamation to convey CVP water to federal contractors through the California Aqueduct. With the signing of the COA and the lifting of the moratorium by the Secretary of the Interior, Reclamation can resume long-term contracting of available and uncommitted water from the CVP.

### Purpose of Water Contracting

Reclamation's long-term water contracting program would, in compliance with applicable state and federal law, meet a combination of the objectives listed below. The program's purpose is not to optimally achieve one or more of these objectives at the expense of others, nor to achieve all objectives equally, but rather to provide a balanced water allocation which, as a whole, best meets project, institutional, environmental, and human needs.

- o equitably allocate remaining CVP yield, considering original congressional legislation, other authorized project functions, and California water rights law and area of origin policies;
- o optimize the amount of water available for beneficial use, considering conjunctive use of surface water and groundwater for agricultural, M&I, and refuge use, and offstream storage at wildlife refuges;
- o increase the amount of water available for beneficial uses within California's Central Valley; and
- o optimize economic returns at the local, regional, and national levels.

### Need for Water Contracting

In 1986 and 1987, Reclamation sent letters to potential water contractors in the Sacramento River, American River, and Delta Export Service Areas asking them to identify how much new or additional water they wished to contract for from the Central Valley Project. Potential contractors were also asked to submit information substantiating their need for water and to submit site-specific data useful for EIS preparation.

Reclamation subsequently received requests from 84 agencies, totaling approximately 4.2 million af/yr. In accordance with Reclamation policy, these requests were evaluated to determine each of the requester's actual water requirements based on acreage, cropping patterns, groundwater availability, population estimates, and other factors. CVP water

needs for agriculture, M&I, and refuges were determined to be about 3.43 million af/yr. In addition, requests for maintaining instream flows and satisfying recreational requirements have been received and are described in this EIS. Reclamation intends to use the water needs estimated during the EIS process as the basis for allocating the available and uncommitted yield of the CVP.

## **SCOPE OF EIS**

### **Scoping Process**

The EIS scoping process identified significant issues and alternatives, helped determine the scope of research needed for each issue, and ensured that important considerations were not overlooked. Through scoping, Reclamation intended to make the EIS more useful to federal decision makers and to those affected by water contracting.

During 1986 and 1987, five scoping meetings were held for the Sacramento River Service Area, six for the American River Service Area, and five for the Delta Export Service Area. Considerable input was received from interested individuals, water districts, municipalities, wildlife refuge managers, agencies, and interest groups. All comments were considered by Reclamation in preparing the EIS's, in analyzing the alternatives in the EIS's, and in determining methods of addressing the impacts.

### **Approach to EIS Preparation**

#### **Alternatives**

Each EIS is based upon a common set of eight CVP-wide water allocation alternatives. These alternatives are different allocations of available CVP yield to each of the three major service areas (SRSA, ARSA, and DESA).

Each EIS then presents a set of eight service area alternatives that are consistent with the framework provided by the CVP-wide alternatives. The service area alternatives are allocations of available CVP yield to meet the needs of specific requesting agencies within each service area.

#### **Levels of Analysis**

The water contracting EIS's include three levels of environmental assessment. First, each water contracting EIS focuses on a common set of CVP-wide water allocation alternatives and analyzes regional impacts of water contracting within a particular service area. Second, each EIS also includes a common cumulative impact assessment that focuses on CVP-wide impacts associated with water contracting in all three service areas. Third, to assist in program decision making, each EIS includes general analysis of site-specific

impacts associated with water contracting with individual agencies. The general approach to preparing the EIS's is shown in Figure 1-2.

Reclamation will use a two-tiered approach to NEPA compliance for individual new or expanded CVP contracts. The water contracting EIS's will serve as the first tier of environmental review by assessing broad, generic regional and cumulative impacts associated with water contracting. The water contracting EIS's will provide NEPA compliance for Reclamation's proposed water allocations within each of the three service areas.

Second-tier, site-specific NEPA environmental reviews, of much narrower scope, will be conducted prior to execution of contracts with each individual agency included in Reclamation's Proposed Action. The scope of subsequent site-specific environmental reviews will be limited to potentially significant site-specific impacts of water contracting within each agency; many of these impacts are preliminarily identified in the site-specific assessments contained in this EIS. The site-specific environmental reviews will provide site-specific compliance with NEPA and with other environmental review laws, such as the Endangered Species Act and the National Historic Preservation Act.

### Related Activities

Reclamation and other agencies are undertaking related activities that could affect CVP water contracting. The most important activities that could affect CVP operations are described below.

#### Other CVP-Wide Activities

- o Reclamation has petitioned the SWRCB for consolidated and expanded place of use for CVP water rights. The SWRCB is preparing an EIR on the petitions.
- o The SWRCB is conducting hearings to review existing water quality standards for the Bay-Delta estuary established by D-1485. The water contracting EIS's use available information from the hearings. All CVP water service contracts will continue to include a water shortage and apportionment article permitting reduced deliveries if hydrologic conditions are inadequate to meet all CVP obligations, including applicable Delta water quality standards.
- o Reclamation is managing a study of Central Valley water-related fish and wildlife problems. Participants include U. S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service, the California Department of Fish and Game (DFG), and DWR. Applicable results have been incorporated into the water contracting EIS's.

- o Reclamation has initiated the Central Valley Task Force to respond to concerns regarding fish and wildlife issues in the Central Valley. Participants include COE, the National Marine Fisheries Service, USFWS, DFG, and DWR.
- o Reclamation is conducting a refuge water supply study. USFWS, DFG, DWR, and California Waterfowl Association are participating in the study. Results have been incorporated into the water contracting EIS's.
- o Reclamation is conducting offstream storage studies. One study emphasizes new storage sites in the San Joaquin Valley; the other is analyzing the use of wildlife refuges as storage sites. Offstream storage could increase CVP yield above that assumed for the EIS's.
- o Six agencies (Reclamation, USFWS, DWR, DFG, SWRCB, and U. S. Geological Survey) jointly administer the Interagency Ecological Study program for the Bay-Delta estuary (also known as the Delta Support Study). The program performs monitoring work as required by D-1485 and collects information on the hydrology, water quality, fisheries, and wildlife of the Bay-Delta estuary. Results of the studies have been used in the EIS's.

#### **Other Activities Related to the Sacramento River Service Area**

- o DFG and DWR are participating in an Instream Flow Incremental Methodology (IFIM) study of the Sacramento River. The data collected will be useful for analyzing fishery and recreational resources; recommendations from this study could cause changes in CVP operations.
- o USFWS is managing a study of the Trinity River basin, under contract to Reclamation. The study recommendations regarding instream flows will be acted on by the Secretary of the Interior.
- o Reclamation is funding a major study by USFWS of the impact of the Red Bluff Diversion Dam on chinook salmon migration. The operation of the dam to protect the winter-run salmon could affect the ability to deliver water from the Tehama-Colusa Canal in winter.
- o Reclamation is installing a temperature curtain in Shasta Reservoir to allow greater regulation of the temperature of water released to the Sacramento River, to improve chinook salmon survival. The temperature curtain is a potential mitigation measure for Sacramento River temperature impacts caused by water contracting.
- o During heavy rains, runoff from Iron Mountain Mine (in the upper Sacramento River watershed) can cause heavy metal contamination of the Sacramento River, which can adversely affect aquatic life. EPA is implementing several remedial actions and is evaluating others.

#### **Other Activities Related to the American River Service Area**

- o Reclamation and the COE are evaluating the effects of allowing interim flood control storage at Folsom Reservoir. The storage would provide the 100-year level of flood protection required by the Federal Emergency Management Agency.
- o Reclamation continues to study issues, including nonfederal financing issues, regarding construction of Auburn Dam; the EIS's do not assume the eventual construction of the dam, but they do address the cumulative effects if the dam were built.

#### **Other Activities Related to the Delta Export Service Area**

- o The Pleasant Valley Water District contracting proposal, pertaining to construction, operation, and delivery of water to the Pleasant Valley System, has been analyzed in the DEWC EIS.
- o The regional impacts of the exchange of services under the Reclamation/DWR Section 10(h) wheeling-purchase contract are discussed in the DEWC EIS.
- o The San Joaquin Valley Drainage Program is a cooperative effort between Reclamation, USFWS, USGS, DFG, and DWR. The program is directed at resolving problems associated with drainwater generated by irrigated agricultural lands in the San Joaquin Valley. The DEWC EIS uses information from the program to analyze drainage impacts of water contracting alternatives.
- o Reclamation has filed petitions for changes in points of diversion of Delta export CVP water with the SWRCB. The petitions request the addition of SWP's Harvey O. Banks Pumping Plant as a point of diversion and redirection for CVP water.
- o Reclamation has included in the DEWC EIS the environmental analysis of the San Joaquin Valley Conveyance Study, which examines how to relieve the present groundwater overdraft.
- o Reclamation and DWR, together with many participating local entities, have initiated a Stanislaus-Calaveras River Basin Water Use Program. The program will evaluate conjunctive use plans to meet the water needs within the Central San Joaquin Water District and Stockton East Water District areas, to permit more effective use of groundwater, to improve fishery and water quality conditions in the Stanislaus River, and to develop additional water supplies for the SWP and CVP from the Delta.
- o Reclamation, DWR, and the South Delta Water Agency are working jointly to develop a long-term solution to water supply and environmental problems through the South Delta Water Management Program. The recommendations



are expected to mitigate adverse effects of CVP and SWP exports from the Delta.

- o DWR has undertaken the North Delta Water Management Program whose primary objectives are to alleviate flood problems, reduce reverse flows in the lower San Joaquin River, improve water quality, reduce fishery impacts, and improve water supply reliability. The recommendations are expected to mitigate adverse effects of CVP and SWP exports from the Delta.
- o Westlands Water District (WWD) is studying construction of an intertie from CVP's Delta-Mendota Canal to the California Aqueduct. WWD and Reclamation are preparing an EIR/EIS that evaluates the various alternatives for diverting and conveying the water.
- o The Los Vaqueros project involves constructing and operating a water supply reservoir in eastern Contra Costa County to provide increased water quality and water system reliability to customers. The Contra Costa Water District (CCWD) is in the process of preparing a project EIR.
- o Reclamation is conducting the Kellogg Unit Reformulation Study to examine relocation of the Contra Costa Canal intake to improve water quality for CCWD.
- o Bedford Properties, Inc., has proposed to use four Delta islands to store water for later sale and to operate waterfowl hunting clubs. Bedford has applied for the required permits; SWRCB and COE are preparing a joint EIR/EIS.

### Institutional Constraints and Considerations

The scope of Reclamation's water contracting program and water contracting EIS's is influenced by many legal, regulatory, and policy constraints and considerations. Several important institutional constraints are listed in the preceding "Related Activities" discussion.

The EIS's also present a more detailed discussion of other institutional constraints used in the determination of available CVP yield and in the development of water contracting alternatives. These constraints include CVP water right permit conditions, Delta pumping permit conditions, and current contractual obligations.

In addition, the EIS's discuss the role of various institutional considerations raised by scoping process presumptions in the development of the water contracting EIS's. These issues include: the need for a single CVP-wide programmatic EIS, the timing of the water contracting EIS's, California area of origin policies, mitigation for past and present CVP impacts, water transfers, and provision of CVP water to subsidized crops.

## ALTERNATIVES

To develop water contracting alternatives for the SRSA, ARSA, and DESA EIS's, CVP-wide water allocation alternatives were first developed. The CVP-wide water allocation alternatives consist of alternative allocations of available CVP yield to each of the three major CVP service areas. A set of detailed service area alternatives was then developed for each of the three service areas. The service area alternatives are consistent with the CVP-wide alternatives and allocate water to individual entities within the service area.

To understand the alternatives, it is important to distinguish three types of CVP supplies: firm yield, intermittent, and interim.

- o Firm yield is a term used by Reclamation, DWR, and other agencies in California to denote water that can be made available by project operations using hydrologic data for the 1928 through 1934 dry period and accepting a deficiency of 100 percent of 1 year's supply over 7 years (not to exceed 25 percent in any 1 year). Imposing such deficiencies in all critically dry years results in delivery of approximately 90 percent of a contract amount for the 57-year hydrologic period used in analyses for this EIS.
- o Intermittent water is a term used by Reclamation to denote water that can be made available by CVP operations in other than critically dry years, in addition to the firm yield water. The amount available depends on the delivery frequency. Reclamation proposes an intermittent supply that results in delivery of approximately 60 percent of a contract amount for the 57-year hydrologic period used in analyses for this EIS.
- o Interim water is that portion of the CVP firm yield which is not delivered to contractors in any given year. Reclamation enters into interim water contracts on an annual basis if supplies are available.

### CVP-Wide Water Allocation Alternatives

#### Factors Considered in Developing CVP-Wide Alternatives

The CVP-wide water allocation alternatives were formulated both to achieve Reclamation's water contracting objectives and to reflect concerns of various agencies, groups, and individuals expressed in the public scoping process. Other factors considered in formulating the CVP-wide alternatives include authorized project functions, COA operational criteria, prior water rights and existing contracts, area of origin policies, and scoping comments related to fish, wildlife, and recreation needs.

## Needs Analysis

An independent needs analysis was prepared that evaluated the water requirements of each entity requesting CVP water and examined the reasonableness of each request. For each requestor the projected water requirement was compared to currently available firm water supplies to establish the need for new or additional CVP water.

A projected contracting date of 1990 was used for the needs analysis. Agricultural water agencies must be able to achieve full use of contract water within 5 years for agencies with existing distribution systems and within 10 years for agencies without existing distribution systems. M&I water agencies must be able to achieve full use of contract water within 25 years. This longer M&I period takes into consideration the gradual growth patterns typical of urban populations and the long-term nature of M&I water supply planning.

CVP water contract terms preclude overuse and subsequent waste of delivered water; the analysis assumed that agencies and their users will adopt economically feasible conservation measures. Proposed Reclamation contracting principles require the safe yield use of local groundwater resources (i.e., use of groundwater that can be developed economically and that does not cause a long-term, progressive decline in groundwater levels or a significant degradation of water quality). Proposed contracting principles also preclude irrigation expansion by agricultural requestors in areas where the groundwater aquifer is overdrafted. The ability of agencies to pay the proposed CVP water rates was not a criterion of the analysis.

For wildlife refuges, two water supply levels are evaluated in the alternatives, Level 2 and Level 4. Level 2 represents the existing average annual supplies of refuges. Level 4 represents the annual supply that would facilitate optimum management of all refuge lands.

The EIS description further details specific methods used to evaluate requests for CVP water for agriculture, M&I, water banking, refuges, and instream flow use. Table S-1 presents estimates of CVP water needs in each service area developed by using the above methods.

## Yield Analysis

The yield analysis determined the amount of CVP water available for contracting under each alternative. To conduct this analysis, Reclamation used a computer program (the Operations Planning Model). Each time the Operations Planning Model is run, a set of assumptions is made with respect to hydrology, the capacity and array of water development facilities, operational criteria, instream flow requirements, water demands, and water supply deficiencies.

Hydrologic data for yield analyses are based on depletion studies performed by DWR and Reclamation. These studies entailed converting historical water supply levels to projected levels of development (e.g., 1985, 2020). Monthly hydrologic data from October 1921 through September 1978 (water years 1922 through 1978) provided a reasonable

Table S-1. CVP Water Requests and Needs

Agriculture, M&I, and Refuge (in thousands af/yr)								
Type of Use	SRSA		ARSA		DESA		Total	
	Request	Need	Request	Need <sup>a</sup>	Request	Need <sup>a</sup>	Request	Need
Agriculture	361	262	307	293	1,959	1,871	2,627	2,426
M&I	133	105	303	245	83	68	519	418
Water banking	0	0	0	0	200	200	200	200
Refuge								
Level 2	143	143	0	0	110	110	253	253
Level 4	<u>171</u>	<u>171</u>	<u>0</u>	<u>0</u>	<u>221</u>	<u>221</u>	<u>392</u>	<u>392</u>
Total with:								
Level 2	637	510	610	538	2,352	2,249	3,599	3,297
Level 4	665	538	610	538	2,463	2,360	3,738	3,436

Note: Table does not include DWR request for 500,000 af/yr of interim CVP water pursuant to Section 10(h) of the COA.

<sup>a</sup> Based on no expansion of irrigated acreage over existing conditions.

Instream Flow Requests (in cubic feet per second)				
Sacramento River below Red Bluff	Normal/ Wet Year 6,000	Dry Year 6,000	Critically Dry Year 4,500	
Lower American River	Oct - 1,750	Jan - 6,000	Apr - 4,600	Jul - 3,500
	Nov - 2,000	Feb - 5,000	May - 4,100	Aug - 3,400
	Dec - 4,250	Mar - 4,800	Jun - 3,750	Sep - 3,000

Lower American River Recreation Flow Requests (in cubic feet per second)			
Oct - 2,000	Jan - 2,000	Apr - 3,000	Jul - 2,500
Nov - 2,000	Feb - 3,000	May - 3,000	Aug - 2,500
Dec - 2,000	Mar - 3,000	Jun - 3,000	Sep - 2,500

representation of hydrologic conditions that might be expected in the future. Existing water deliveries were simulated to establish 1985 conditions for reservoir levels and stream flows over the 57-year period of record. The 1985-level operation studies simulate current conditions as closely as possible. Future water deliveries are simulated to establish 2020 conditions under the No-Action Alternative (assuming full delivery of quantities under existing CVP contracts) and other alternatives.

### **Summary of CVP-Wide Allocation Alternatives**

The Operations Planning Model was used to help formulate the various CVP-wide water allocation alternatives. The CVP-wide water allocation alternatives are various ways of allocating available firm and intermittent yield totals to each service area. They are the framework for the more detailed service area alternatives. The service area alternatives allocate firm and intermittent yield to individual service area requestors.

The model projects how much water would be available for contracting under several different scenarios, which aids in the selection of the water allocation alternatives. Results of the computer modeling runs indicated that the amounts of firm and intermittent yield that is available for contracting vary depending on the place of use and the kind of use.

Table S-2 summarizes the allocations of available firm yield and intermittent yield water to the three service areas under each CVP-wide alternative. These alternatives are briefly described below.

**No-Action Alternative.** This alternative was developed to meet NEPA requirements and to serve as a baseline for assessing the impacts of other alternatives. The No-Action Alternative describes both existing (1985) conditions and projected future (2020) conditions in the absence of new water contracting.

**Alternative 1: Dependable Supply Contracting.** Firm yield available for contracting is far less than the 3.43 million af/yr of need. For this reason, Reclamation has considered dependable supply contracting to increase the amount of CVP water available to meet service area needs.

Dependable supply contracting would reduce the amount of firm yield contracted, thereby increasing the amount of intermittent yield available. Deliveries of intermittent yield on a dependable supply contract basis would be adjusted according to the wetness of the year as measured by the Sacramento River Index. Under a dependable supply contracting approach, the CVP supply could be supplemented with groundwater or local surface water supplies during normal, dry, and critical years to meet needs.

Two options, differing in the emphasis placed on dependable supply contracting, have been developed for Alternative 1. Option 1A, Partial Dependable Supply Contracting, would allocate firm yield to requestors within constructed units up to the limit of existing facility capacities, with all other allocations being intermittent yield. Under this option, firm yield water would be allocated to meet the agricultural and M&I needs of all requestors within constructed units where Reclamation's past water contracting programs have not been completed, limited to the amounts that can be delivered using existing facilities.

Table S-2. CVP-Wide Yield Allocations by Alternative  
(in thousands af/yr)

Alter- native	Sacramento River Service Area						American River Service Area				Delta Export Service Area						Total Allocations	
	Firm			Intermittent			Firm		Inter- mittent		Firm			Intermittent			Firm Yield	Inter- mittent Yield
	Ag	M&I	Refuge	Ag	M&I	Refuge	Ag	M&I	Ag	M&I	Ag	M&I	Refuge	Ag	M&I	Refuge		
1A	175	5	0	87	100	143	109	178	183	68	269	1	0	187	0	110	737	878
1B	75	5	0	187	100	171	0	152	293	93	344	23	0	45	0	221	600	1,110
2	175	5	0	0	0	0	109	178	0	0	269	1	0	0	0	0	737	0
3	262	105	0	0	0	143	293	245	0	0	328	11	0	147	0	110	1,244	400
4A/B	175	5	0	0	0	171	109	178	0	0	682	27	0	0	0	221	1,176	391
4C/D	0	0	0	0	0	143	0	0	0	0	1,707	27	0	147	0	110	1,735	400
5	0	0	171	0	0	0	0	0	0	0	0	0	220	0	0	0	391	0
6	175	5	143	0	0	0	121	196	0	0	321	18	110	396	4	0	1,089	400
7	0	0	0	0	0	171	0	0	0	0	0	0	0	0	0	220	0	391

Intermittent yield would be allocated under this option to three types of requestors: first, to supplement firm yield allocations to area of origin requestors within constructed units whose needs would not entirely be met with firm yield allocations due to facility limitations; second, to provide requestors outside constructed units with CVP water for use in conjunction with other surface water or groundwater supplies to develop a firm supply; and third, to refuges, which would receive Level 2 supplies. The delivery of intermittent water to certain requestors would require construction of new facilities to increase conveyance capacities. Reclamation recognizes that this option may result in the allocation of some intermittent yield to agencies that do not have developable groundwater to firm up the intermittent surface water supply and that those agencies will need to develop alternative surface water supplies or join with neighboring agencies in a regional groundwater development.

Under Option 1B, Full Dependable Supply Contracting, firm yield water would be allocated only to those requestors without a developable groundwater supply; the developability of a groundwater supply would be determined considering physical availability, groundwater quality, and costs. All other area of origin requestors, and DESA requestors (to the supply available) with dual systems already in place, would be offered dependable supply contracts. Refuges would receive Level 4 supplies of intermittent water. Option 1B, as compared to Option 1A, would rely more heavily on dependable supply contracting in the area of origin to increase the amount of CVP water available.

**Alternative 2: Agricultural and M&I Needs Within Previously Constructed CVP Units.** This alternative was developed to give contracting priority to agricultural and M&I uses (which historically have been a priority for long-term contracts) and to give contracting priority to entities located within those CVP units already constructed. These firm yield allocations would be limited by the remaining capacity of existing facilities. Water would not be provided to authorized but currently unconstructed units, to other proposed unconstructed projects, or to refuges. A portion of the firm yield and all of the intermittent yield would be allocated to meet future area of origin needs.

**Alternative 3: Agricultural and M&I Needs in Areas of Origin.** This alternative is similar to Alternative 2 in that it gives contracting priority to agricultural and M&I uses. Contracting priority is given to those entities located within the CVP areas of origin, in consideration of established state policies. Under this alternative, available intermittent water would be allocated to meet refuge Level 2 needs and to meet water banking needs in the DESA.

**Alternative 4: Agricultural and M&I Needs in the Delta Export Service Area (San Joaquin and Santa Clara Valleys).** This alternative is also similar to Alternative 2 in that it gives contracting priority to agricultural and M&I uses, but to entities within the San Joaquin Valley, where the most CVP water has been requested. It was proposed to maximize regional and national economic return from irrigated agriculture. Four subalternatives are included within this alternative. Under 4A and 4B, deliveries within the DESA would be limited to use of remaining capacity in the Delta/Mendota Canal and the federal portion of San Luis Reservoir. Under 4C and 4D, deliveries would not be limited to the capacity of existing facilities. Under Alternatives 4A/B, available intermittent water would be allocated to meet refuge needs, providing the annual water supply that would facilitate optimum management of all lands of each refuge (Level 4). Under Alternatives

4C/D, intermittent water would be allocated to meet refuge needs at a level of the existing annual water supply (Level 2) and to meet Delta export water banking needs.

**Alternative 5: Refuge and Instream Flow Needs.** This alternative was developed to give priority to maintenance and enhancement of Central Valley fish and wildlife resources. Refuge needs would be met with firm yield based on refuge Level 4 estimates, and instream flow needs for fish and wildlife would be met with firm yield to the extent possible. Available intermittent water would be allocated to increase Delta outflow.

**Alternative 6: Refuge and M&I Needs Within Previously Constructed CVP Units, American River Instream Flow Needs, and American River Recreation Needs.** This alternative was developed to allow analysis of a "hybrid" water contracting policy, allocating water to refuge, M&I, and American River flow needs. Firm yield would be allocated first to refuge Level 2 needs, next to M&I needs within constructed CVP units, then to American River instream flow needs for fisheries and recreation. Remaining firm yield would be allocated to constructed units. Intermittent water would be allocated to water banking and Mid-Valley Canal needs in the DESA.

**Alternative 7: Recreation Needs.** This alternative gives preference to selected recreational needs. In response to specific priorities identified during the scoping process, priority for firm yield allocations would be given first to maintaining water-based recreation in the lower American River, then to maintaining levels in Clair Eagle, Shasta, and Folsom Reservoirs. Intermittent water would be allocated to meet refuge Level 4 needs.

### **Proposed CVP-Wide Water Allocation**

A proposed CVP-wide water allocation was selected to develop a consistent proposed contracting action in each service area and to maximize the available water supply among the variety of competing beneficial uses. The proposed CVP-wide water allocation would allocate available CVP-wide yield to each of the three service areas. Proposed actions for each of the three service areas would then tentatively allocate the service area total to individual requestors.

**Proposed Allocation.** During the process of formulating alternatives to depict options with a broad spectrum of environmental consequences, it became apparent that the number of possible combinations of water allocations is essentially unlimited. It also became apparent that selecting a proposed CVP-wide allocation would depend in great measure on existing and projected CVP capability and the public comments received on this document. However, in keeping with the stated purpose of optimizing the amount of water available, it is necessary to consider the attributes of all alternatives analyzed. Reclamation's proposed CVP-wide allocation contains elements of several of the alternatives and is based, in part, on the following criteria:

- o Water would be allocated to areas for which major conveyance facilities exist and construction of only minor facilities are required to make additional deliveries. In some cases it may also be necessary to enter into agreements for use of conveyance facilities owned by others and to construct local distribution facilities.



- o Water would be allocated to areas which are presently authorized for service.
- o Water would be allocated to the areas of origin to the extent there is conveyance capacity for delivery.
- o Water would be allocated to meet the full needs of the wildlife refuges.
- o Water would be allocated in a way which strongly encourages conjunctive use for agriculture, M&I, and refuges in order to increase the existing water supply and maximize the use of this valuable California resource.
- o Consideration would be given to integration of local groundwater supplies into available CVP supply in order to increase California's total water supply and assist areas with payment capacity limitations.

Three types of allocations would be made: firm, conditional, and intermittent. The firm water allocation is firm yield which can be delivered from existing CVP facilities. The conditional allocation consists of firm yield water available to Reclamation which requires access to the conveyance facilities of others. The intermittent allocation is water available in some years, some of which (north of the Delta) can be conveyed in CVP facilities, and some of which is dependent on capacity in existing non-Reclamation facilities. Proposed CVP-wide allocations, and tentative proposed allocations to individual agencies within each service area, are given in Table S-3.

In the SRSA approximately 15,000 af/yr of firm water and 160,000 af/yr of intermittent water would be allocated to agricultural use, 4,800 af/yr of firm water would be allocated to M&I use, and 171,000 af/yr of intermittent water would be allocated to wildlife refuges. In the ARSA approximately 317,000 af/yr of water would be allocated to areas in Sacramento County. M&I uses would receive 174,200 af/yr of firm water and 22,050 af/yr of intermittent water, and agriculture would receive 60,450 af/yr of firm water and 60,450 af/yr of intermittent water. The final mix of firm and intermittent may be adjusted depending on the capability of groundwater basins to be used in conjunction with intermittent supplies. In the DESA approximately 309,000 af/yr of firm water would be allocated, primarily for agricultural use. Two hundred thousand af/yr of conditional water and 371,000 af of intermittent water would be allocated, delivery of which would be dependent upon access to capacity in DWR facilities.

**Interim Water.** As estimated 800,000 af/yr of CVP firm yield water would be available for interim contracting during the next 20 years. Reclamation proposes the following method of contracting interim water. Interim water would be used for up to 10 years to make intermittent allocations firm until alternative supplies have been developed. Interim water would be allocated to those intermittent water contractors without existing alternative supplies based on the contractor's ability to use the water. Preference would be given to contractors located in an overdraft area. Interim water would also be allocated to the state under a 10(h) wheeling agreement. The amounts of interim water allocated to the state and others would be reduced over time as intermittent contracts are signed, and as firm yield contracts build out.

Table S-3. Proposed CVP-Wide Water Allocation  
(in af/yr)

Area/Agency	Principal Type of Use	Water Allocation			
		Firm	Conditional <sup>a</sup>	Intermittent	Total
<u>SRSA<sup>e</sup></u>					
Shasta Dam Area Public Utility District	M&I	4,800	-	-	4,800
<u>Sacramento Valley Canals Agencies<sup>b</sup></u>					
Colusa County Water District	Ag	-	-	50,000	50,000
Corning Water District	Ag	-	-	7,800	7,800
Dunnigan Water District	Ag	-	-	5,100	5,100
Glenn-Colusa Irrigation District	Ag	-	-	23,800	23,800
Glenn County Lands	Ag	-	-	20,200	20,200
Glide Water District	Ag	-	-	9,700	9,700
Holthouse Water District	Ag	-	-	2,500	2,500
Orland-Artois Water District	Ag	-	-	33,400	33,400
Rancho Saucos Water District	Ag	-	-	3,600	3,600
Tehama Ranch Mutual Water Company	Ag	-	-	1,400	1,400
Yolo-Zamora Water District	Ag	15,000	-	2,800	17,800
Colusa National Wildlife Refuge <sup>c</sup>	Refuge	-	-	25,000	25,000
Delevan National Wildlife Refuge <sup>c</sup>	Refuge	-	-	30,000	30,000
Y Lodge Wildlife Management Area	Refuge	-	-	36,000	36,000
Sacramento National Wildlife Refuge <sup>c</sup>	Refuge	-	-	50,000	50,000
Sutter National Wildlife Refuge	Refuge	-	-	30,000	30,000
Subtotal SRSA		19,800	-	331,300	351,100
<u>ARSA</u>					
Folsom, City of	M&I	20,900	-	-	20,900
Mather Air Force Base	M&I	350	-	-	350
<u>Multi-District Area<sup>b</sup></u>					
San Juan Suburban Water District	M&I	26,100	-	-	26,100
Citizens Utility Company	M&I	10,800	-	10,800	21,600
Northridge Water District	M&I	6,600	-	6,600	13,200
McClellan Air Force Base	M&I	1,250	-	1,250	2,500
Rio Linda County Water District	M&I	3,400	-	3,400	6,800
<u>Sacramento County Water Agency<sup>b</sup></u>					
Area 1	Ag	14,500	-	14,500	29,000
Area 3	Ag	23,050	-	23,050	46,100
Omochumnes-Hartnell Water District	Ag	6,000	-	6,000	12,000
Galt Irrigation District	Ag	15,550	-	15,550	31,100
Clay Water District	Ag	1,350	-	1,350	2,700

Table S-3. Continued

Area/Agency	Principal Type of Use	Water Allocation			Total
		Firm	Conditional <sup>a</sup>	Intermittent	
Galt, City of	M&I	9,900	-	-	9,900
Laguna/Elk Grove	M&I	77,700	-	-	77,700
Sunrise East area	M&I	17,200	-	-	17,200
Subtotal ARSA		234,650	-	82,500	317,150
<b>DESA</b>					
Panoche Water District	Ag	-	23,000	-	23,000
Pleasant Valley Water District	Ag	-	40,000	-	40,000
San Luis Water District	Ag	-	35,000	-	35,000
Westlands Water District	Ag	250,000	100,000	-	350,000
Mid-Valley Water Authority Agencies	Ag	-	-	190,000	190,000
San Felipe Unit	Ag/M&I	19,000	-	-	19,000
City of Dos Palos	M&I	-	1,300	-	1,300
Veterans Admin.	M&I	-	850	-	850
Grassland RCD	Refuge	-	-	130,000	130,000
Kesterson National Wildlife Refuge	Refuge	6,500	-	-	6,500
Los Banos National Wildlife Refuge	Refuge	18,800	-	-	18,800
Mendota Wildlife Management Area	Refuge	-	-	5,050	5,050
Merced National Wildlife Refuge	Refuge	-	-	4,000	4,000
San Luis National Wildlife Refuge	Refuge	14,700	-	4,300	19,000
Tranquility G. C.	Refuge	-	-	300	300
Volta Wildlife Management Area	Refuge	-	-	6,000	6,000
Kern National Wildlife Refuge	Refuge	-	-	25,000	25,000
Pixley National Wildlife Refuge	Refuge	-	-	6,000	6,000
Subtotal DESA		309,000	200,150	370,650 <sup>d</sup>	879,800
TOTALS		563,450	200,150	784,450	1,548,050

<sup>a</sup> Firm water subject to available capacity in the California Aqueduct, and dependent upon a permit to pump at Banks.

<sup>b</sup> Final mix of firm and intermittent may be adjusted depending on the capability of the groundwater basins.

<sup>c</sup> Requires use of the Red Bluff Diversion Dam during the winter salmon run, or an alternative delivery facility, and due to TCC capacity limitations, can only be delivered during non-peak irrigation months.

<sup>d</sup> Subject to available capacity in the California Aqueduct, and dependent upon a permit to pump at Banks.

<sup>e</sup> Based on information available at the time of preparation of the Draft, no allocation was made to the Yolo-Solano agencies in the proposed action. However, more recent information indicates that the agencies, consistent with the criteria set forth on page 2-25, merit preferential consideration for an allocation of 142,400 af/yr of water.

**Offstream Storage at Wetland Habitat.** Reclamation is studying the potential of developing additional CVP yield that could be produced by using wetland habitats for offstream storage. Under this concept, return flows from CVP water delivered to federal, state, or privately managed wetlands would be integrated with the rest of the CVP supply. Following completion of Reclamation's studies of wetland habitat offstream storage, more definite estimates of potential additional CVP yield will be available. At that time, Reclamation will consider allocation of any additional yield and contact potential contractors to determine their interest in participating in specific refuge offstream storage projects.

## **Sacramento River Service Area Water Contracting Alternatives**

SRSA alternatives are summarized in Table S-4.

### **No-Action Alternative**

Under the No-Action Alternative, no new long-term contracts would be signed with agencies in the SRSA, but water deliveries in the SRSA would expand modestly from present (1985) levels as existing firm yield contractors reach their contract maximums and contracts are renewed following expiration. Deliveries in 2020 are assumed to be 3,138,200 af/yr, an increase of 45,800 af from the 1985 deliveries of 3,092,400 af/yr. These deliveries reflect a general increase in agricultural and M&I deliveries amounting to 105,800 af/yr and a reduction in interim water deliveries to refuges from 60,000 af/yr to zero.

If no additional CVP water contracts are signed, it is assumed that some SRSA needs would be met from groundwater pumping and that other needs would not be met because of the lack of a feasible alternative supply. New surface water projects are not assumed under the No-Action Alternative.

### **Alternative 1: Dependable Supply Contracting**

Alternative 1 has two options that differ from traditional firm yield contracting in the degree of emphasis placed on dependable supply contracting. (See Table S-4.) Under both options, interim water would be supplied for up to 10 years to meet dependable yield contracts during dry years until alternative dry year supplies are developed. To implement the dependable supply contracting required by either option, two operational strategies exist, one that has a district-level perspective and the other a regional perspective.

**Option 1A.** Option 1A would allocate firm yield water to requestors within constructed CVP units, limited by the capacity of existing facilities. Intermittent water would be allocated to supplement firm yield allocations to requestors within constructed units where available facility capacity limits the amount of water that can be delivered and to requestors outside constructed units (including refuges) that would need to use CVP water in conjunction with other surface water and/or groundwater supplies to develop a firm supply.

Table S-4. Requesting Agency Water Allocations:  
Sacramento River Service Area

Agency	Use Type	Additional CVP Water Need	1A			1B			2		3		4A/B		4C/D		5		6		7	
			CVP Water Allocation		% of Need	CVP Water Allocation		% of Need	Water Allocation	% of Need	Water Allocation	% of Need	Water Allocation	% of Need	Water Allocation	% of Need	Water Allocation	% of Need	Water Allocation	% of Need	Water Allocation	% of Need
			Firm	Intermt		Firm	Intermt															
Shasta Dam Area Public Utility District	M&I	4,800	4,800	0	100	4,800	0	100	4,800	100	4,800	100	4,800	100	0	0	0	0	4,800	100	0	0
<u>Sacramento Valley Canals Agencies</u>																						
Colusa County WD	Ag	55,000	42,000	13,000	100	32,900	22,100	100	42,000	76	55,000	100	42,000	76	0	0	0	0	42,000	76	0	0
Corning WD	Ag	7,800	7,800	0	100	7,800	0	100	7,800	100	7,800	100	7,800	100	0	0	0	0	7,800	100	0	0
Dunnigan WD	Ag	5,600	4,300	1,300	100	5,200	400	100	4,300	76	5,600	100	4,300	76	0	0	0	0	4,300	76	0	0
Glenn-Colusa ID	Ag	23,000	23,800	0	100	0	023,800	100	23,800	100	23,800	100	23,800	100	0	0	0	0	23,800	100	0	0
Glenn County																						
Glide WD	Ag	2,000	1,500	500	100	0	2,000	100	1,500	76	2,000	100	1,500	76	0	0	0	0	1,500	76	0	0
Kanawha WD	Ag	9,200	7,000	2,200	100	0	9,200	100	7,000	76	9,200	100	7,000	76	0	0	0	0	7,000	76	0	0
Orland-Artois WD	Ag	9,500	7,300	2,200	100	10	9,500	100	7,300	76	9,500	100	7,300	76	0	0	0	0	7,300	76	0	0
Willow Creek MWC.	Ag	1,500	1,200	300	100	0	1,500	100	1,200	76	1,500	100	1,200	76	0	0	0	0	1,200	76	0	0
Glide WD	Ag	10,700	8,200	2,500	100	2,000	8,700	100	8,200	76	10,700	100	8,200	76	0	0	0	0	8,200	76	0	0
Holthouse WD	Ag	2,800	2,100	700	100	1,800	1,000	100	2,100	76	2,800	100	2,100	76	0	0	0	0	2,100	76	0	0
Orland-Artois WD	Ag	36,700	27,900	8,800	100	8,700	28,000	100	27,900	76	36,700	100	27,900	76	0	0	0	0	27,900	76	0	0
Rancho Saucos WD	Ag	4,000	3,100	900	100	1,700	2,300	100	3,100	76	43,000	100	3,100	76	0	0	0	0	3,100	76	0	0
Tehama Ranch MWC.	Ag	1,500	1,200	300	100	300	2,400	100	1,200	76	1,500	100	1,200	76	0	0	0	0	1,200	76	0	0
Yolo-Zamora WD	Ag	49,400	37,700	11,700	100	15,000	34,400	100	37,700	76	49,400	100	37,700	76	0	0	0	0	37,700	76	0	0
Subtotal		219,500	175,100	44,400	100	75,200	144,300	100	175,100	80	219,500	100	175,100	80	0	0	0	0	175,100	80	0	0
<u>Yolo-Solano CVP Water Service Coord. Group</u>																						
Yolo County FC&WCD	Ag	42,000	0	42,000	100	0	42,000	100	0	0	42,000	100	0	0	0	0	0	0	0	0	0	0
Davis, City of	M&I	9,200	0	9,200	100	0	9,200	100	0	0	9,200	100	0	0	0	0	0	0	0	0	0	0
Woodland, City of	M&I	11,800	0	11,800	100	0	11,800	100	0	0	11,800	100	0	0	0	0	0	0	0	0	0	0
Solano County	M&I	79,400	0	79,400	100	0	79,400	100	0	0	79,400	100	0	0	0	0	0	0	0	0	0	0
Subtotal		142,400	0	142,400	100	0	142,400	100	0	0	142,400	100	0	0	0	0	0	0	0	0	0	0

C-055425

Table S-4. Continued

Agency	Use Type	Additional CVP Water Need	1A		1B		2		3		4A/B		4C/D		5		6		7			
			CVP Water Allocation		% of Need	CVP Water Allocation		% of Need	CVP Water Allocation		% of Need	CVP Water Allocation		% of need	CVP Water Allocation		% of Need	CVP Water Allocation		% of Need		
			Firm	Intermt		Firm	Intermt		CVP Water Allocation	% of Need		CVP Water Allocation	% of need		CVP Water Allocation	% of Need						
<u>Refuges</u>																						
Colusa NWR	Refuge	25,000 <sup>a</sup>	0	25,000	100 <sup>b</sup>	0	25,000	100 <sup>b</sup>	0	0	25,000 <sup>c</sup>	100 <sup>b</sup>	25,000 <sup>c</sup>	100	25,000 <sup>c</sup>	100 <sup>b</sup>	25,000	100	25,000	100 <sup>b</sup>	25,000 <sup>c</sup>	100
Delevan NWR	Refuge	30,000 <sup>a</sup>	0	21,000	100 <sup>b</sup>	0	30,000	100 <sup>b</sup>	0	0	21,000 <sup>c</sup>	100 <sup>b</sup>	30,000 <sup>c</sup>	100	21,000 <sup>c</sup>	100 <sup>b</sup>	30,000	100	21,000	100 <sup>b</sup>	30,000 <sup>c</sup>	100
Gray Lodge WMA	Refuge	36,000 <sup>a</sup>	0	27,400	100 <sup>b</sup>	0	36,000	100 <sup>b</sup>	0	0	27,400 <sup>c</sup>	100 <sup>b</sup>	36,000 <sup>c</sup>	100	27,400 <sup>c</sup>	100 <sup>b</sup>	36,000	100	27,400	100 <sup>b</sup>	36,000 <sup>c</sup>	100
Sacramento NWR	Refuge	50,000 <sup>a</sup>	0	46,400	100 <sup>b</sup>	0	50,000	100 <sup>b</sup>	0	0	46,400 <sup>c</sup>	100 <sup>b</sup>	50,000 <sup>c</sup>	100	46,400 <sup>c</sup>	100 <sup>b</sup>	50,000	100	46,400	100 <sup>b</sup>	50,000 <sup>c</sup>	100
Sutter NWR	Refuge	30,000 <sup>a</sup>	0	23,500	100 <sup>b</sup>	0	30,000	100 <sup>b</sup>	0	0	23,500 <sup>c</sup>	100 <sup>b</sup>	30,000 <sup>c</sup>	100	23,500 <sup>c</sup>	100 <sup>b</sup>	30,000	100	23,500	100 <sup>b</sup>	30,000 <sup>c</sup>	100
Subtotal		171,000	0	143,300	100 <sup>b</sup>	0	171,000	100	0	0	143,300 <sup>c</sup>	100 <sup>b</sup>	171,000 <sup>c</sup>	100	143,000 <sup>c</sup>	100	171,000	100	143,500	100 <sup>b</sup>	171,000 <sup>c</sup>	100
Total		537,700	179,900	330,100	100	80,000	457,700	100	179,900	33	510,000	100	350,900	69	143,300 <sup>c</sup>	28	171,000	32	232,200	63	171,000 <sup>c</sup>	32
Proposed Action Total				510,000			537,700															

Note: The No-Action Alternative, under which there would be no new CVP water service contracting, is not shown on this table.

<sup>a</sup> Level 4 needs shown; Level 2 needs are:

Colusa NWR:	25,000 af/yr
Delevan NWR:	21,000 af/yr
Gray Lodge WMA:	27,400 af/yr
Sacramento NWR:	46,400 af/yr
Sutter NWR:	23,500 af/yr

<sup>b</sup> Percentage is of level 2 needs.

<sup>c</sup> Denotes intermittent water.

Under Option 1A, a total of about 180,000 af/yr of firm yield water would be contracted to requestors in constructed units. This includes 4,800 af/yr to Shasta Dam Area Public Utility District and 175,000 af/yr for requestors in the Sacramento Valley Canals Unit. Remaining needs of requestors served by the Tehama-Colusa Canal, needs of refuges (Level 2), and requests by the Yolo-Solano CVP Water Service Coordinating Group would be met with intermittent water under dependable supply contracting. Intermittent water deliveries would meet the equivalent of 330,100 af/yr on a firm yield basis. Intermittent water deliveries would vary significantly from year to year, depending on availability.

**Option 1B.** Option 1B would allocate firm yield water only to those requestors that do not have developable groundwater supplies; all other requestors would be provided intermittent water for use in conjunction with other available water to meet their total requirements. Under Option 1B, a total of about 80,000 af/yr of firm yield water would be contracted in the SRSA. This includes 4,800 af/yr to Shasta Dam Area Public Utility District and 75,000 af/yr to agricultural requestors in the Sacramento Valley Canals Unit whose available groundwater does not lend itself to intermittent operation.

The remaining needs of requestors served by the Tehama-Colusa Canal, refuges, and the Yolo-Solano CVP Water Service Coordinating Group would be met with intermittent water, as described under Option 1A, except that Level 4, rather than Level 2, refuge needs would be met. Intermittent water deliveries would meet the equivalent of 457,000 af/yr on a firm yield basis and would vary significantly from year to year.

#### **Alternative 2 - Agricultural and M&I Needs Within Constructed CVP Units**

Under Alternative 2, new or expanded water service contracts would be signed with requestors in the constructed portion of the Sacramento Canals Unit, where Reclamation's past contracting program has not been completed. As shown in Table S-4, firm yield water would be contracted to selected agricultural and M&I requestors.

A total of 175,100 af/yr would be contracted to requestors served by the Corning and Tehama-Colusa Canals, providing 76 percent of the needed water. Water would be allocated equally (on a percentage of need basis) to all requestors receiving water from the Tehama-Colusa Canal under this alternative. Of the M&I requestors, only the Shasta Dam Area Public Utility District would be allocated its full need (4,800 af).

#### **Alternative 3 - Agricultural and M&I Needs in Areas of Origin**

Under Alternative 3, new or expanded CVP water service contracts would be signed to provide the entire needs of agricultural and M&I requestors in the SRSA, plus the Level 2 needs of refuges. As shown in Table S-4, agricultural and M&I needs (261,500 and 105,200 af/yr, respectively) would be provided on a firm basis, whereas refuge Level 2 supplies (143,300 af/yr) would be provided on an intermittent basis. The refuges' intermittent supplies would be used in conjunction with available groundwater, in effect providing a firm supply. The delivery of water allocated under this alternative would

require modification of existing water conveyance facilities and construction of new facilities.

#### **Alternatives 4A/B - Agricultural and M&I Needs in the DESA**

Alternative 4 emphasizes allocations to agricultural and M&I requestors in the DESA. Four subalternatives allocate this water in various ways within the DESA, including Alternatives 4A and 4B, which would allocate water limited to available capacities in existing Delta export pumping and conveyance facilities, with remaining CVP yield allocated to requestors in constructed units in the SRSA. In addition, intermittent water would be allocated to meet refuge needs (Level 4). Allocations would be identical to Alternative 2. (See Table S-4.)

#### **Alternatives 4C/D - Agricultural and M&I Needs in the DESA**

Alternatives 4C and 4D would allocate all available firm yield irrespective of existing Delta export pumping and conveyance capacities. Under this alternative, the only water contracted in the SRSA would be intermittent supplies to the refuges (Level 2 needs). No water would be allocated to SRSA agricultural or M&I requestors.

#### **Alternative 5 - Refuge and Instream Flow Needs**

Alternative 5 gives preference to maintenance and enhancement of Central Valley fish and wildlife resources. In the SRSA, Level 4 needs (171,000 af/yr) for the five refuges would be met on a firm basis, as shown in Table S-4. Available remaining yield would be committed to maintaining Sacramento River flows for fisheries purposes. Available intermittent water would be allocated to increase Delta outflow. No water would be allocated to SRSA agricultural or M&I requestors.

#### **Alternative 6 - Refuge Needs, M&I Needs Within Constructed CVP Units, and American River Instream Flow Needs**

Alternative 6 gives preference to a variety of uses to allow evaluation of a hybrid alternative. In the SRSA, water would be allocated to agricultural and M&I requestors on the same basis as for Alternative 2, including limitations imposed by capacities of existing conveyance facilities, as shown on Table S-4. Water would be allocated to SRSA refuges on a firm basis, equal to Level 2 needs.

#### **Alternative 7 - Recreation Needs**

Alternative 7 gives preference to selected recreational needs associated with Shasta, Clair Engle, and Folsom Reservoirs and the Trinity and lower American Rivers. In the SRSA, water would be allocated first to maintaining Shasta and Clair Engle Reservoir levels as high as possible given available yield, with available intermittent water allocated to



refuge Level 4 needs, as shown in Table S-4. Trinity County's request for 500 cfs in the Trinity River during July, August, and September would also be met. No water would be allocated to SRSA agricultural or M&I requestors.

### **Proposed Action**

Reclamation's proposed water contracting action in the SRSA is similar to Alternatives 1B and 2 (Table S-3). About 15,000 af/yr of firm water, and 160,000 af/yr of intermittent water, would be allocated to Sacramento Valley agricultural uses, 4,800 af/yr of firm water would be allocated to Shasta Dam PUD, and 171,000 af/yr of intermittent water would be allocated to meet refuge Level 4 needs. No CVP water would be allocated to Yolo and Solano County requestors, since no major conveyance facilities exist to deliver CVP water to those requestors.

## **Actions Needed to Implement Alternatives**

### **Congressional Actions**

Activities that are not part of Reclamation's Proposed Action may, however, require congressional authorization if Reclamation were to later become involved in implementation. These activities include planning and funding of well fields and dual systems to support dependable supply contracts on wildlife refuges, federal participation in planning and funding groundwater development or dual systems for agricultural and M&I requestors, federal participation in planning and funding of new regional conveyance facilities, and approval of a 10(h) agreement with DWR.

### **Permits and Entitlements Required from Other Agencies**

**Lifting of Corps Criteria.** Full implementation of Alternatives 4 and 6 in the DESA would require lifting of the Corps Delta pumping criteria, which in turn is dependent on completion of DWR's North and South Delta Plans.

**Agreement with DWR.** Alternatives 1, 3, 4, 6, and the Proposed Action in the DESA would require a wheeling agreement or other contractual arrangement with DWR for utilization of available capacity in the California Aqueduct.

**State Water Resources Control Board.** The SWRCB would need to approve Reclamation's petition for consolidated and expanded place of use to fully implement Alternatives 1, 2, 3, 4, 6, and the Proposed Action. (Requestors with lands outside the currently authorized place of use are identified in Chapter 4.) To implement these alternatives, the SWRCB would also need to approve Reclamation's petition for additional diversions at the Harvey O. Banks Pumping Plant.

## Proposed Contracting Principles

Reclamation will contract for new or additional water supplies in accordance with Reclamation law and policies, as well as applicable federal, state, and local law. Reclamation will publicly announce its intent to contract water prior to execution of each contract. It is anticipated that all new contracts will be subject to several common contracting principles, including those listed below.

1. Contracts will continue to allow Reclamation to adjust delivery quantities to accommodate changes in the available water supply. In its operation of the CVP, Reclamation must make periodic determinations of the water available for delivery to its contractors. These determinations are based on consideration of a number of factors including, but not limited to, the following: past and forecasted precipitation, carryover storage in CVP reservoirs, instream flow requirements (principally the Trinity, Sacramento, Stanislaus, and American Rivers), Sacramento-San Joaquin Delta consumptive uses, outflow requirements to meet water quality standards, and delivery requests of its contractors.
2. Water made available under the contracting program will encourage conjunctive use of surface water and groundwater supplies in those areas with developable groundwater. The maximum project allocation committed to a contractor will be premised on the contractor's groundwater availability in years of below normal precipitation. Use of surface water supplies during years of above-normal precipitation will allow recharge of the groundwater basin.
3. Interim water will be made available to dependable supply contractors during the early years of the contract term to provide time for the development of the groundwater supply system that will permit full deliveries in the below-normal water years.
4. Water rates will be determined in accordance with the current CVP water rate setting policy. Rates for individual districts will vary depending on the type of service received and the amount of previous repayment of CVP costs.
5. Contracts for water service will include a water use buildup schedule and minimum payments related to the contract maximum. This requirement will encourage reasonable requests for water and will ensure payment of the appropriate share of the project costs by each water user. The amount of water in the buildup schedule must be paid for whether the water is used or not.
6. Reclamation will establish the time period for entering into a water service contract following the Record of Decision for each water-contracting EIS. Agencies failing to meet the established time period will lose their priority for receiving CVP water. This water will then be available for use elsewhere in the CVP.
7. In areas of groundwater overdraft, CVP water will not be provided for irrigation of newly irrigated lands. Reclamation recognizes that irrigation users may still decide to develop additional acreage in overdraft areas with groundwater.

8. In its operation of the CVP, Reclamation will use all reasonable means to guard against a condition of shortage in the quantity of CVP water available to contractors. Nevertheless, if a shortage does occur because of drought, or other causes, Reclamation will apportion available water among the water users capable of receiving water from CVP facilities in such manner as deemed equitable and physically possible, consistent with existing contracts and CVP authorizations.

## **SUMMARY OF IMPACTS**

### **Introduction**

#### **Approach to Impact Analysis**

Impacts of Reclamation's water contracting alternatives were determined by comparing predicted 2020 environmental conditions under Alternatives 1 through 7 with predicted 2020 baseline environmental conditions under the No-Action Alternative.

The No-Action Alternative assumes full buildout of existing CVP contracts. Such buildout of existing CVP contracts would, for some resource categories, cause major changes between existing (1985) conditions and 2020 No-Action conditions. These changes are not impacts of entering into new or expanded CVP contracts under Alternatives 1 through 7 and can be considered as potential impacts of Reclamations's past contracting actions, which cumulatively add to the additional incremental impacts of new contracting under Alternatives 1 through 7.

Impacts were judged to be either beneficial, adverse and less than significant, or adverse and significant. An impact is considered beneficial if environmental conditions would improve compared to 2020 baseline conditions under No-Action. An impact is considered adverse if environmental conditions would worsen compared to 2020 baseline conditions.

#### **Proposed Action Impacts**

Because hydrologic and related modeling of the Proposed Action has not yet been performed, the impact analyses presented in the EIS do not specifically describe the impacts of Reclamation's Proposed Action. Within the SRSA, however, the Proposed Action is similar to Alternatives 1B and 2, and the Proposed Action's regional and site-specific impacts would therefore be expected to be similar to those of Alternatives 1B and 2.

## Mitigation Measures

Reclamation has identified potential mitigation measures to avoid or reduce adverse impacts associated with the Reclamation's water contracting alternatives. Reclamation at this time has not selected those mitigation measures to be implemented and invites public comments on the potential mitigation measures described in this chapter. Reclamation will select those mitigation measures to be implemented at the time of the Final EIS and Record of Decision, once Reclamation's proposed contracting action has been finalized.

## Summary of Regional and Site-Specific Impacts

Table S-5 is a summary of regional and site-specific impacts of Reclamation's water contracting alternatives.

## Summary of Cumulative Impacts

Chapter 5 of the EIS analyzes three types of cumulative impacts of Reclamation's water contracting program. First, it analyzes cumulative impacts of water contracting alternatives within all three service areas (SRSA, ARSA, and DESA), including Delta and Bay impacts; Table S-6 summarizes selected cumulative impacts. Second, it presents historical perspectives on Central Valley, Delta, and Bay fisheries, vegetation and wildlife resources, and identifies opportunities for Reclamation to mitigate for resource declines directly attributable to the CVP. Third, it summarizes cumulative impacts of future related actions when added to the impacts of Reclamation's water contracting program.

## Unresolved Issues

Two types of further studies will be necessary to fully resolve certain issues identified in the EIS. First, additional planning studies are needed to determine the best methods to implement conjunctive use programs called for under the Proposed Action. Second, additional site-specific environmental assessments will be conducted prior to entering into new or expanded CVP contracts.

The Final EIS will further address several other issues not fully resolved in the Draft EIS:

1. Reclamation will rerun the Operations Planning Model and related models to incorporate improvements to the hydrologic database and the Operations Planning Model, and to address an error resulting in firm yield values up to 300,000 af/yr less than those used in the draft EIS analyses. Where changes in allocations under the alternatives are necessary, DESA allocations will be reduced.
2. Reclamation will analyze with greater specificity the Proposed Action impacts, based on additional runs of the Operations Planning Model and related models.

3. Reclamation will describe the potential effects of the SWRCB's Draft Sacramento-San Joaquin Delta Water Quality Control Plan, released in November 1988, on the CVP water contracting program.
4. Mitigation measures to be implemented will be selected. Procedures for mitigation of site-specific impacts, in particular those on special-status species, wetlands, and cultural resources, will be identified.

Table S-5. Summary of Regional and Specific Impacts - Sacramento River Service Area

Regional 2020 Baseline Conditions (No Action)	Impacts (Changes from 2020 Baseline Conditions)	Alternative 1	Alternative 2	Alternative 3	Alternative 4 A/B	Alternative 4 C/D	Alternative 5	Alternative 6	Alternative 7
<b>SOILS AND DRAINAGE</b>									
o Slightly increased soil salinity and boron levels	<u>Regional</u> o Changes in soil salinity and boron levels	N	N	N	N	N	N	N	N
	<u>Site Specific<sup>a</sup></u> o Poor drainage of 8,000 acres in Yolo- Zamora W.D.	S	S	S	S	N (No change)	N (No change)	S	N (No change)
<b>SURFACE WATER HYDROLOGY AND SEEPAGE</b>									
o -13% change from 1985 conditions.	<u>Regional</u> o Changes in Sacramento River instream flows (annual averages) below Keswick in critically dry years (% change from 2020 baseline conditions).	* (+10)	* (+7)	* (+6)	* (+6)	* (+13)	* (+11)	* (+8)	* (+3)
o +6% change from 1985 conditions.	o Changes in Claire Engle Reservoir storage in critically dry years (% change from 2020 baseline conditions).	* (+16%)	* (No change)	* (-1%)	* (+13%)	* (+9%)	* (-1%)	* (+2%)	* (-4%)
o +27% change from 1985 conditions.	o Changes in Shasta Reservoir storage in critically dry years (% change from 2020 baseline conditions).	* (-30%)	* (-15%)	* (-14%)	* (-27%)	* (-25%)	* (-25%)	* (-22%)	* (-3%)

S = Significant impact versus 2020 Baseline Conditions  
 N = No significant impact versus 2020 Baseline Conditions  
 B = Beneficial impact versus 2020 Baseline Conditions  
 \* = Significance of impact determined by other resource categories

<sup>a</sup> Additional significant site-specific impacts not included in regional impacts

Table S-5. Continued

Regional 2020 Baseline Conditions (No Action)	Impacts (Changes from 2020 Baseline Conditions)	Alternative 1	Alternative 2	Alternative 3	Alternative 4 A/B	Alternative 4 C/D	Alternative 5	Alternative 6	Alternative 7
<b>SURFACE WATER QUALITY</b>									
o 75% of years (increase of 54% over 1985 baseline conditions).	<u>Regional</u> o Change in % of years when Sacramento River July mean monthly temperatures equal or exceed 60°F at Red Bluff (with temperature curtain).	*	*	*	*	*	*	*	*
		(+16%)	(No change)	(-27%)	(+13%)	(-25%)	(+2%)	(+2%)	(No change)
o Increase in constituent loading.	o Change in constituent concentrations.	*	*	*	*	*	*	*	*
<b>GROUNDWATER</b>									
o Net 2020 groundwater storage = 101,900 af (overdraft condition).	<u>Regional</u> o Changes in 2020 groundwater storage (af).	B (+157,200 to +164,800)	B (+33,500)	B (+164,800)	B (+9,900)	S (-16,000)	B (+23,100)	B (+56,600)	S (-23,600)
o No substantial regional changes.	o Changes in groundwater quality.	N	N	N	N	N	N	N	N
	<u>Site Specific</u> o Refuge groundwater overdraft.	S	N	S	S	S	N	N	S
<b>FISHERIES</b>									
o Spawning conditions would be improved slightly for fall and late fall runs but winter and spring runs would be adversely affected versus 1985. No rearing conditions for all runs would be adversely affected versus 1985.	<u>Regional</u> o Impacts on Sacramento River chinook salmon spawning, rearing, and entrainment.	S (Spawning for spring run under Option A; spawning for winter and spring runs and rearing for all runs under Option B.)	N	S (Spawning for spring run)	N	S (Spawning for winter and spring run)	N	S (Spawning for winter and spring run)	S (Spawning for winter run)

S = Significant impact versus 2020 Baseline Conditions

N = No significant impact versus 2020 Baseline Conditions

B = Beneficial impact versus 2020 Baseline Conditions

\* = Significance of impact determined by other resource categories

<sup>a</sup> Addition of significant site-specific impacts not included in regional impacts

Table S-3. Continued

Regional 2020 Baseline Conditions (No Action)	Impacts (Changes from 2020 Baseline Conditions)	Alternative 1	Alternative 2	Alternative 3	Alternative 4 A/B	Alternative 4 C/D	Alternative 5	Alternative 6	Alternative 7
<b>FISHERIES, Continued</b>									
o Trinity River fishery not affected.	o Impacts on Trinity River chinook salmon.	N	N	N	N	N	N	N	N
o Shasta and Clair Engle Reservoir fisheries not affected.	o Impacts on Shasta and Clair Engle Reservoirs.	N	N	N	N	S (Sunfish spawning success in both reservoirs)	N	S (Shasta Reservoir habitat)	N
<b>VEGETATION AND WILDLIFE</b>									
o Reduction in extent and changes in composition and structure.	o <u>Regional</u> Changes in Sacramento River riparian communities.	N (Option A) S (Option B)	N	S	N	S (Below Red Bluff Dam)	B	N	N
o -79 miles	o Potential impacts on tributary riparian communities beyond 2020 baseline conditions (miles potentially affected).	S (-84)	S (-72)	S (-84)	S (-72)	N (No change)	N (No change)	S (-72)	N (No change)
o -1,600 ac	o Potential impacts on wetland communities beyond 2020 baseline conditions (acres potentially affected).	S (-1,200)	S (-1,200)	S (-1,200)	S (-1,200)	N (No change)	N (No change)	S (-1,200)	N (No change)
o 47 species	o Potential impacts on special-status species beyond 2020 baseline conditions (number of species potentially affected).	S (10 Option A 11 Option B)	S (9)	S (10)	S (10)	N (No change)	S (2)	S (9)	S (2)
o -39,000 ac	o Potential impacts on terrestrial communities beyond 2020 baseline conditions (acres potentially affected).	S (-24,000)	S (-22,000)	S (-24,000)	S (-22,000)	N (No change)	N (No change)	S (-22,000)	N (No change)

S = Significant impact versus 2020 Baseline Conditions

N = No significant impact versus 2020 Baseline Conditions

B = Beneficial impact versus 2020 Baseline Conditions

\* = Significance of impact determined by other resource categories

<sup>a</sup> Additional significant site-specific impacts not included in regional impacts



Table S-5. Continued

Regional 2020 Baseline Conditions (No Action)	Impacts (Changes from 2020 Baseline Conditions)	Alternative 1	Alternative 2	Alternative 3	Alternative 4 A/B	Alternative 4 C/D	Alternative 5	Alternative 6	Alternative 7
<b>VEGETATION AND WILDLIFE,</b> Continued									
o -19,000 ac	<u>Site Specific<sup>a</sup></u> o Changes in refuge wetland acres.	B (+20,500 - Option A, +23,000 - Option B)	N (No change)	B (+20,500)	B (+23,000)	B (+20,500)	B (+23,000)	B (+20,500)	B (+20,500)
<b>RECREATION</b>									
o Little change in reservoir elevation versus historical averages.	<u>Regional</u> o Changes in Shasta Reservoir recreation due to lower reservoir levels.	S	N	S	N	S	S	S	B
o Higher reservoir elevation versus historical averages.	o Changes in Clair Engle Reservoir recreation due to lower reservoir levels.	S (Option A) N (Option B)	N	N	N	S	S	B	B
o 73% increase in visitor-days relative to 1985 conditions.	o Changes in Sacramento River recreation (% change on visitor-days versus Alt. 1).	N ( $<10\%$ decrease)	N ( $<10\%$ decrease)	N ( $<10\%$ decrease)	N ( $<10\%$ decrease)	N ( $<10\%$ decrease)	N ( $<10\%$ decrease)	B (increase)	B (increase)
o 55% increase in visitor-days relative to 1985 conditions.	o Changes in Trinity Reservoir recreation (% change in visitor-days versus Alt. 1).	N (No change)	N (No change)	N (No change)	N (No change)	N (No change)	N (No change)	N (No change)	B (increase)
o Reduction in visitor-days relative to 1985 conditions.	o Changes in refuge recreation (% change in visitor-days versus Alt. 1).	B (+112% - Option A, +49% - Option B)	N (No change)	B (+12%)	B (+148%)	B (+112%)	B (+149%)	B (+112%)	B (+149%)

S = Significant impact versus 2020 Baseline Conditions  
 N = No significant impact versus 2020 Baseline Conditions  
 B = Beneficial impact versus 2020 Baseline Conditions  
 \* = Significance of impact determined by other resource categories

<sup>a</sup> Additional significant site-specific impacts not included in regional impacts

Regional 2020 Baseline Conditions (No Action)	Impacts (Changes from 2020 Baseline Conditions)	Alternative 1	Alternative 2	Alternative 3	Alternative 4 A/B	Alternative 4 C/D	Alternative 5	Alternative 6	Alternative 7
<b>AESTHETICS</b>									
o Potentially improved quality.	<u>Regional</u> o Changes in Sacramento River visual quality.	N	N	S	N	S	N	N	N
o Degraded quality.	o Changes in Shasta Reservoir visual quality.	N (Option A) S (Option B)	N	N	N	S	N	S	N
o Potentially improved quality.	o Changes in Clair Engle Reservoir visual quality.	N	N	N	N	N	N	N	N
<b>ECONOMICS</b>									
o Increase in irrigation and recreation earnings from 1985.	<u>Regional</u> o Changes in regional irrigation, and recreation earnings (\$1,000) from 2020 baseline conditions.	* (+20,953 Option A) (+18,803 Option B)	* (+21,078)	* (+20,828)	* (+16,638)	* (-14,413)	* (-11,911)	* (+17,238)	* (+5,659)
<b>ENERGY</b>									
o Increase in energy used for groundwater pumping from 1985 of 10,843 MWh.	<u>Regional</u> o Changes in energy used for groundwater pumping from 2020 baseline conditions (MWh).	B (-16,544 - Option A) (-16,038 - Option B)	B (-5,276)	B (-16,544)	B (-2,516)	N (+2,253)	B (-353)	B (-5,629)	* (2,760)
<b>LAND USE</b>									
o Land conversions of 165 acres to agriculture, 35,000 acres to urban, 21,300 acres to upland.	<u>Regional</u> o Potential irrigation on lands outside existing or proposed place of use (additional acres).	N (17,000)	N (12,760)	N (17,000)	N (12,760)	N (0)	N (0)	N (12,760)	N (0)

S = Significant impact versus 2020 Baseline Conditions

N = No significant impact versus 2020 Baseline Conditions

B = Beneficial impact versus 2020 Baseline Conditions

\* = Significance of impact determined by other resource categories

<sup>a</sup> Additional significant site-specific impacts not included in regional impacts

12/09/88

SRSUMT/ESTHER

Table S-5. Continued

Regional 2020 Baseline Conditions (No Action)	Impacts (Changes from 2020 Baseline Conditions)	Alternative 1	Alternative 2	Alternative 3	Alternative 4 A/B	Alternative 4 C/D	Alternative 5	Alternative 6	Alternative 7
<b>LAND USE, Continued</b>									
	o Potential irrigation in Class 6 or unclassified lands (additional acres).	N (9,540)	N (4,540)	N (9,540)	N (4,540)	N (0)	N (0)	N (4,540)	N (0)
	o Potential conversion of wetlands due to agricultural or urban development (additional acres).	S (1,200)	S (1,200)	S (1,200)	S (1,200)	N (0)	N (0)	S (1,200)	N (0)
<b>POPULATION, HOUSING, AND RELATED SOCIAL EFFECTS</b>									
	<u>Regional</u>								
o 75% increase from 1985.	o Changes in population.	N	N	N	N	N	N	N	N
o 72% increase from 1985.	o Changes in housing.	N	N	N	N	N	N	N	N
<b>CULTURAL RESOURCES</b>									
	<u>Regional</u>								
o 64 cultural resource sites exposed within the maximum drawdown zone. (This is a 24% reduction from 1985 levels.)	o Changes in the number of cultural resources exposed by changes in reservoir level fluctuations at Shasta Reservoir.	S (+20)	S (+15)	S (+15)	S (+20)	S (+20)	S (+17)	S (+20)	S (+8)
	<u>Site Specific<sup>a</sup></u>								
	o Potential impacts to refuge cultural resources.	S	N	S	S	S	S	S	S

S = Significant impact versus 2020 Baseline Conditions

N = No significant impact versus 2020 Baseline Conditions

B = Beneficial impact versus 2020 Baseline Conditions

\* = Significance of impact determined by other resource categories

<sup>a</sup> Additional significant site-specific impacts not included in regional impacts

Table S-6. Summary of Selected Cumulative Impacts

CVP-Wide 2020 Baseline Conditions	Impacts (Changes from 2020 Baseline Conditions)	Alternative 1A	Alternative 1B	Alternative 2	Alternative 3	Alternative 4 A/B	Alternative 4 C/D	Alternative 5	Alternative 6	Alternative 7
<b>SURFACE WATER HYDROLOGY</b>										
o 4% more reservoir storage compared to 1985 conditions	o Changes in average annual reservoir storage (Clair Engle, Shasta, and Folsom Reservoirs)	*	*	*	*	*	*	*	*	*
		(-5%)	(-10%)	(-5%)	(-5%)	(-5%)	(-15%)	(-10%)	(-8%)	(no change)
o 2% less inflow compared to 1985 conditions	o Changes in average annual Delta inflow	*	*	*	*	*	*	*	*	*
		(-4%)	(-4%)	(-4%)	(-4%)	(-4%)	(no change)	(no change)	(-2%)	(no change)
o 2% less outflow compared to 1985 conditions	o Changes in average annual Delta outflow	*	*	*	*	*	*	*	*	*
		(-4%)	(-10%)	(-4%)	(-4%)	(-4%)	(-13%)	(-4%)	(-6%)	(no change)
<b>SURFACE WATER QUALITY</b>										
o Standards met	o Ability to meet D-1485 salinity standards, including operational flexibility	*	*	*	*	*	na	*	*	*
		(standards met)	(standards met)	(standards met)	(standards met)	(standards met)		(standards met)	(standards met)	(standards met)
<b>ENERGY</b>										
o 3,600 Gwh	o Changes in annual project power generation (Gwh)	N	N	N	N	N	N	N	N	N
		(-210)	(-420)	(-210)	(-50)	(-360)	(-790)	(-100)	(-310)	(-20)
o 982 Gwh	o Changes in annual energy used for groundwater pumping (Gwh)	B	B	B	B	B	B	B	B	B
		(-390)	(-369)	(-171)	(-341)	(-260)	(-315-4C, -255-4D)	(-9)	(-236)	(-9)

S = Significant impact versus 2020 baseline conditions.

N = No significant impact versus 2020 baseline conditions.

B = Beneficial impact versus 2020 baseline conditions.

\* = Significance of impact determined by other resource categories.

na = not available.

Table S-6. Continued

CVP-Wide 2020 Baseline Conditions	Impacts (Changes from 2020 Baseline Conditions)	Alternative 1A	Alternative 1B	Alternative 2	Alternative 3	Alternative 4 A/B	Alternative 4 C/D	Alternative 5	Alternative 6	Alternative 7
<b>FISHERIES</b>										
	o Chinook salmon impacts	S (Sac. R.)	S (Sac. R., Delta)	N	S (Sac. R., Delta)	N	S (Sac. R.)	B (Sac. R., Delta) S/B (Amer. R.)	S (Sac. R.)	N
	o Steelhead trout impacts	N	N	N	N	N	S (Sac. R.)	B (Delta)	N	N
	o Striped bass impacts	S (Delta)	S (Delta)	S (Delta)	S (Delta)	S (Delta)	NA	B (Delta)	S (Delta)	N
	o American shad impacts	N	N	N	N	N	N	N	N	N
	o Impacts on other species	S (Delta)	S (Delta)	S (Delta)	S (Delta)	S (Delta)	N	B (Delta)	S (Delta)	N
	o Impacts on special-status species	S (Delta)	S (Sac. R., Delta)	S (Delta)	S (Delta)	S (Delta)	S (Sac. R.)	S/B (Sac. R.)	S (Sac. R., Delta)	S (Sac. R.)
	o Impacts on reservoir species	S (Folsom Res.)	S (Folsom Res.)	S (Folsom Res.)	S (Folsom Res.)	S (Folsom Res.)	S (3 reservoirs)	S (Folsom Res.)	S (Folsom Res.)	S (Folsom Res.)
<b>VEGETATION AND WILDLIFE</b>										
	o Impacts on Suisun Marsh vegetation and wildlife	S	S	S	S	S	S	N	S	S

S = Significant impact versus 2020 baseline conditions.

N = No significant impact versus 2020 baseline conditions.

B = Beneficial impact versus 2020 baseline conditions.

\* = Significance of impact determined by other resource categories.

na= not available.

Table S-6. Continued

CVP-Wide 2020 Baseline Conditions	Impacts (Changes from 2020 Baseline Conditions)	Alternative 1A	Alternative 1B	Alternative 2	Alternative 3	Alternative 4 A/B	Alternative 4 C/D	Alternative 5	Alternative 6	Alternative 7
ECONOMICS	oTotal increase in economic benefits (irrigation, M&I, recreation and power) (\$1,000)	• (\$44,322)	• (\$6,202)	• (\$24,197)	• (\$54,885)	• (\$35,891-4A, \$30,022-4B)	• (\$-50,114-4C, \$-49,089-4D)	• (\$-45,363)	• (\$18,848)	• (\$8,151)

S = Significant impact versus 2020 baseline conditions.

N = No significant impact versus 2020 baseline conditions.

B = Beneficial impact versus 2020 baseline conditions.

\* = Significance of impact determined by other resource categories.

na= not available.

S-38

C - 0 5 5 4 4 3

C-055443